

REMARKS

In an Office Action mailed October 28, 2008, the Examiner rejected all of the pending claims 1-8 and 10-17. For reasons set out below, Applicants respectfully traverse the rejections and request reconsideration and allowance of pending claims 1-8 and 10-17.

Claim Rejections – 35 USC § 103:Claims 1-8, 12 and 13:

Applicants respectfully submit that claims 1-8, 12 and 13 are not obvious over Lee et al. in view of Yu because neither Lee nor Yu, alone or in combination, disclose, teach, suggest or otherwise make obvious each and every limitation of the rejected claims. Moreover, as discussed further below, Applicants respectfully submit that it would not have been obvious to combine Lee with Yu to practice all of the limitations of the rejected claims because persons of ordinary skill in the art would not have replaced the Off mode of Lee with the asynchronous mode of Yu. Applicants respectfully submit that such a combination is based on improper hindsight reasoning. Reconsideration is respectfully requested.

Applicants respectfully submit that neither Lee nor Yu disclose, teach, suggest or otherwise make obvious at least the following limitations:

“an inverter which is operated in a synchronous mode when the timing signal is received from the inverter control unit, and in an asynchronous mode when the timing signal is not received from the inverter control unit”

as recited in claims 1 and 4.

In Lee et al., the B/L CONTROL ON and OFF signals are on or off. An OFF B/L CONTROL which prevents operation of the inverter when off – is not consistent with an inverter “operated in . . . an asynchronous mode.” Since there is no signal, it cannot be said to operate asynchronously, as there is no signal to be considered asynchronous with the “timing signal.” It is merely off. Non-operation is not the same as being “operated in . . . an

asynchronous mode” as recited in claims 1 and 4.

Yu, on the other hand, states that:

“the disclosed driver circuit uses asynchronous driving within a work period. Its advantage is that the power consumption of the LCDM can be largely lowered during operations. Furthermore, the invention only requires a driving component to produce driving signals. In comparison with the prior art where each set of CCFL needs an individual driving component, the invention needs fewer components and thus saves the cost. The invention further minimizes the space use of the circuit, which is convenient for circuit designs.”

2: 66-3:8.

Taken together, Lee discusses BL/Control ON and OFF. Yu discusses “asynchronous driving.” However, neither Lee nor Yu disclose, teach or suggest, “an inverter which is operated in a synchronous mode when the timing signal is received from the inverter control unit, and in an asynchronous mode when the timing signal is not received from the inverter control unit” as recited in Claim 1. Lee does not suggest operating in two different modes at two different times – depending on the presence or absence of a timing signal. Yu does not suggest operating in two modes – moreover, it suggests operating only in ONE mode – namely asynchronous. The Examiner has not shown a motivation to combine Lee with Yu. Furthermore, both Yu and Lee teach against the combination. Lee discusses B/L Control on or off. Yu discusses asynchronous ONLY when on. Neither Yu nor Lee, alone or in combination, disclose, teach, suggest or otherwise make obvious “a synchronous mode when the timing signal is received from the inverter control unit, and in an asynchronous mode when the timing signal is not received,” as recited in Claim 1.

Applicants therefore respectfully request that the Examiner allow claims 1 and 4. Dependent claims 2, 3 and 5-7 are also allowable for similar reasons.

Lee also does not disclose:

“driving, by an inverter, a lamp in synchronism with the timing signal during a synchronous mode when the timing signal is input from the inverter control unit and in asynchronism with the timing signal during an asynchronous mode when the timing signal is not input from the inverter

control unit”

as recited in claim 8. As discussed above, the backlight in Lee is either driven or not driven. Lee does not disclose “driving . . . a lamp in synchronism with the timing signal during a synchronous mode . . . and in asynchronism with the timing signal during an asynchronous mode,” as recited in Claim 8. As discussed above, Yu discusses only asynchronous operation. Neither Lee nor Yu disclose, teach, suggest or otherwise make obvious “driving . . . in synchronism . . . when the timing signal is input . . . and in asynchronism . . . when the timing signal is not input,” as recited in Claim 8.

Applicants therefore respectfully request that the Examiner allow claim 8.

Dependent claims 12 and 13 are also allowable for similar reasons.

No Motivation to Combine Lee with Yu:

Moreover, the Examiner has not shown that there would have been a motivation to combine Lee with Yu since Lee teaches against Yu and vice versa. The on/off synchronous operation of Lee does not suggest a combination with the asynchronous only operation of Yu – and the asynchronous operation of Yu does not suggest combination with Lee.

In the Office Action, the Examiner stated:

“it would have been obvious to one skill (sic) in the art at the time of the invention was made to incorporate Yu’s idea of driving lamp that emits light asynchronously into the liquid crystal display device (LCD) of Lee et al. to make a LCD device where an inverter operates both in synchronous and asynchronous mode in order to drive the lamp that emits light synchronously and asynchronously according to the mode of operation with reduced lighting malfunction.”

OA at 3-4. Applicants respectfully disagree. Lee teaches synchronous operation or non-operation. Yu teaches asynchronous operation. Neither Lee nor Yu disclose, teach, suggest or otherwise make obvious combining the two.

The instant application states a problem and proposes a solution:

Recently, liquid crystal display devices are widely used as a combination TV and monitor, in which moving images are mostly displayed in television mode, whereas still images are mostly displayed in monitor mode.

As a method of controlling an inverter for driving the lamp in such a liquid crystal display device, there are a synchronous method of applying a horizontal synchronous signal of the liquid crystal module to the inverter and driving the lamp at a frequency synchronous with the horizontal signal, and a asynchronous method of driving the lamp at the frequency of the inverter itself.

In case of the asynchronous method, interference (e.g., beat phenomenon) between the lamp frequency and a frame frequency is generated, and thus, a moiré phenomenon may be produced on the screen. Such a moiré phenomenon is observed more easily in still images than in moving images.

To solve such a problem, the synchronous method of applying the horizontal synchronous signal to the inverter for driving the lamp and causing the inverter to drive the lamp in synchronization with the horizontal synchronous signal has been employed.

Even in such a case, however, when changing between moving-image and still-image modes the frequency of the synchronous signal applied to the inverter temporarily increases, and thus, it exceeds the allowed value of the lamp frequency. Therefore, there is a problem of light malfunction in that the lamp goes out.

SUMMARY OF THE INVENTION

The present invention is conceived to solve the aforementioned problems. Accordingly, an object of the present invention is to provide a power supply, a liquid crystal display device and a method of driving the same, wherein a moiré phenomenon, which may be produced on a liquid crystal display screen upon changing between moving-image and still-image modes, can be eliminated and the problem of lighting malfunctions of lamps can also be solved.

According to an aspect of the present invention for achieving the object, there is provided a power supply, which comprises a mode setting unit for outputting a control signal according to a selected display mode, an inverter control unit for selectively outputting a timing signal received from the outside according to the control signal from the mode setting unit, and an inverter which is operated in either synchronous or asynchronous mode in response to the selectively output timing signal.

Application-as-filed, paragraphs [0005]-[0011]. Neither Lee nor Yu state disclose, teach or

suggest such a problem or propose such a solution. Applicants respectfully submit that combining Lee with Yu amounts to the improper use of hindsight, based on teachings from the application. Applicants respectfully submit that it would not have been obvious to a person of ordinary skill in the art would have combined Lee with Yu to practice all of the limitations of the rejected claims.

Applicants therefore respectfully request that the Examiner allow Claims 1-8, 12 and 13.

Claims 10, 11 and 14-17:

Applicants respectfully submit that claims 10, 11 and 14-17 are NOT obvious over Lee et al in view of Yu and in further view of Park for reasons similar to those given above with respect to Claims 1, 4 and 8 because Claims 10, 11 and 14-17 depend, directly or indirectly from independent Claims 1, 4 or 8. Park does not cure the deficiencies of Lee and Yu as discussed above.

In the Office Action, the Examiner stated:

“it would have been obvious to one skill (sic)in the art at the time of the invention was made (sic) to include Park’s idea of using separate level of control modes into the LCD device of Lee et al. (as modified by Yu) to develop a liquid crystal device with two different level of control modes for moving-image and still-image in order to reduce lighting malfunction.”

OA at 5. As discussed above, the Examiner has not shown a motivation to combine Lee with Yu. The Examiner has also not shown a motivation to combine Lee and Yu further with Park to practice all of the limitations of the rejected claims.

Applicants respectfully submit that Park does not cure any of the deficiencies of Lee.

Park discusses:

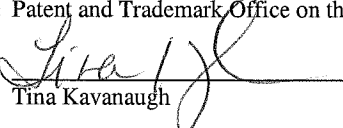
“checking the image signals, and when the image signals are found to be moving pictures, outputting a high or low voltage to the inverter according to whether the image signals require high or low luminance level driving so as to increase or decrease luminance levels of the LCD panel, and when the image signals are found to be still images, outputting a control signal of outputs of a predetermined luminance level.”

Paragraph [0010]. In Park, "high or low voltage" is outputted for a moving picture according to whether the image signals require "high or low luminance level." For still images, it outputs "a control signal . . . of a predetermined luminance level." In other words, Park changes the voltage output based on a desired luminance level. It does not disclose, teach or suggest, "an inverter which is operated in a synchronous mode when the timing signal is received from the inverter control unit, and in an asynchronous mode when the timing signal is not received from the inverter control unit," as recited in independent claims 1 and 4, or "driving, by an inverter, a lamp in synchronism with the timing signal during a synchronous mode when the timing signal is input from the inverter control unit and in asynchronism with the timing signal during an asynchronous mode when the timing signal is not input from the inverter control unit," as recited in independent claim 8. Therefore, Applicants respectfully submit that dependent claims 10, 11 and 14-17 are allowable over Lee in view of Park.

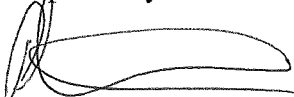
CONCLUSION

For the foregoing reasons, Applicants respectfully request reconsideration and allowance of all pending claims. If the Examiner has any questions or concerns, a telephone call to the undersigned at (949) 752-7040 is welcomed and encouraged.

The Commissioner is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No. 50-2257.

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I hereby certify that this correspondence is being electronically submitted via EFS Web to the United States Patent and Trademark Office on the date shown below.	
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Respectfully submitted,



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